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Road vehicles - Vehicle to grid communication interface - Part 20: 2nd generation network layer and application layer requirements (ISO/FDIS 15118-20:2022)

Straßenfahrzeuge - Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation - Teil 20: 2. Generation Anforderungen an das Netzwerk- und Anwendungsprotokoll (ISO/FDIS 15118-20:2022)

Véhicules routiers - Interface de communication entre véhicule et réseau électrique - Partie 20: Exigences des couches réseau et application de 2ème génération (ISO/FDIS 15118-20:2022)

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## Road vehicles — Vehicle to grid communication interface —

### Part 20: 2nd generation network layer and application layer requirements

*Véhicules routiers — Interface de communication entre véhicule et  
réseau électrique —*

*Partie 20: Exigences des couches réseau et application de 2ème  
génération*

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## Foreword

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This document was prepared jointly by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*, Technical Committee IEC/TC 69, *Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 301, *Electrically propelled road vehicles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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## ISO/FDIS 15118-20:2022(E)

### Introduction

The pending energy crisis and necessity to reduce greenhouse gas emissions started in the former century has led the vehicle manufacturers to a very significant effort to reduce the energy consumption of their vehicles up to the present. As countermeasures to this continuous problem, they developed vehicles partly or completely propelled by electric power and launched them into the market. Those vehicles will reduce the dependency on oil, improve the global energy efficiency and reduce the total CO<sub>2</sub> emissions for road transportation if the electricity is produced from renewable sources. To charge electricity to the batteries of such vehicles, a specific charging infrastructure is required.

Much of the standardization work on dimensional and electrical specifications of the charging infrastructure for electric vehicles and the vehicle interface were treated in the relevant ISO or IEC groups. However, the standardization work about direct information transfer between the electric vehicle and the charging infrastructure was not enough, and it was assigned to the ISO 15118 series to treat the subject sufficiently.

Such communication is necessary for the optimization of energy resources and energy production systems. With it electric vehicles can be connected to the supply network and communicate the most economic or most energy efficient way for charging/discharging. It is also required to develop efficient and convenient billing systems in order to cover the resulting payments. The necessary communication channel can serve in the future to contribute to the stabilization of the supply network as well as to support additional information services required to operate electric vehicles efficiently and economically.

After the standardization work of the first basic smart charging was completed, more standardization work for further evolved functions and high energy efficiency was continuously requested again.

It includes:

- improved charge methods that reduces efforts and agonies of the charging operation;
- extended functions for the electric vehicles to be utilized as distributed energy resources, which enable smoothing of the electricity load of the supply network for higher energy efficiency and also provide power back to the grid;
- information services for the user with higher added value and new convenience.

As for the communication system, the next evolution will be expected to realize these new applications.

# Road vehicles — Vehicle to grid communication interface —

## Part 20: Network and application protocol requirements

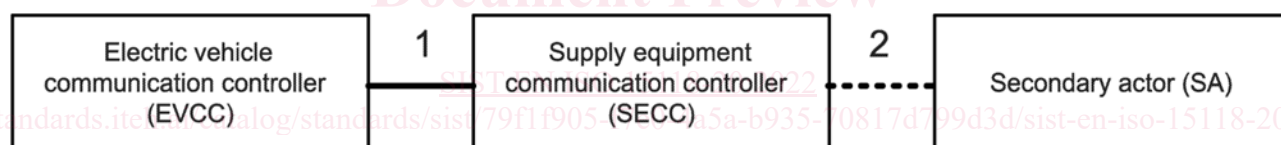
### 1 Scope

This document specifies the communication between the electric vehicle (EV), including battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV), and the electric vehicle supply equipment (EVSE). The application layer messages defined in this document are designed to support the electricity power transfer between an EV and an EVSE.

This document defines the communication messages and sequence requirements for bidirectional power transfer.

This document furthermore defines requirements of wireless communication for both conductive charging and wireless charging as well as communication requirements for automatic connection device and information services about charging and control status.

The purpose of this document is to detail the communication between an electric vehicle communication controller (EVCC) and a supply equipment communication controller (SECC). Aspects are specified to detect a vehicle in a communication network and enable an Internet Protocol (IP) based communication between the EVCC and the SECC (see Figure 1).



#### Key

- 1 scope of this document
- 2 message definition considers use cases defined for communication between SECC to SA

**Figure 1 — Communication relationship among the EVCC, SECC and SA**

This document defines messages, data model, XML/EXI-based data representation format, usage of V2GTP, TLS, TCP and IPv6. These requirements belong to the 3<sup>rd</sup> until the 7<sup>th</sup> OSI layer model. In addition, the document describes main service sequences of conductive charging, wireless power transfer and bidirectional power transfer, and how data link layer services can be accessed from an OSI layer 3 perspective.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3780, *Road vehicles – World Manufacturer Identifier (WMI) code*

ISO 4217, *Codes for the representation of currencies*

**ISO/FDIS 15118-20:2022(E)**

ISO 15118-2:2014, *Road vehicles — Vehicle to grid communication interface — Part 2: Network and application protocol requirements*

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**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

**3.1 access point**

**AP**  
wireless communication device that allows the user to connect to other wireless or wired communication devices

**3.2 authorization mode**

authenticate and authorize the user account

Note 1 to entry: Authorization mode refers to *EIM* (3.17) and *PnC* (3.41).

**3.3 automatic connection device pantograph**

**ACDP**  
components supporting the automatic connection and disconnection process for conductive energy transfer between an EV and EVSE via pantograph

**3.4 basic charging**

**BC**  
charging based on PWM